

VLBI Polarisation Images of the Gravitational Lens B0218+357

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Abstract.

We present preliminary polarisation VLBI maps of the gravitational lens system B0218+357, made at 3 different frequencies.

1. Summary

We have made VLBI polarisation observations of the gravitational lens system B0218+357 (Patnaik et al, 1993). Observations at 8.4 GHz were made on 9 May 1995, using the NRAO VLBA together with the 100m Effelsberg telescope, and at 22 and 43 GHz on 29 May 1996 using the VLBA alone. Reduction of the data was made using standard procedures in the AIPS software package.

Preliminary maps are presented in Figure 1. The "core" and "knot" components, seen by Patnaik et al (1995) at 15 GHz, appear at all 3 frequencies in both A and B images. The core (right) is highly polarised - consistent with the high degree of polarisation variability shown by this source (Biggs et al, 1999).

Both the A and B image paths are known to suffer high Faraday rotation, with a differential RM of 980 ± 10 rad m⁻² between the images (Patnaik et al, *these proceedings*). Our observations are not suitable for a direct determination of RMs as they are not simultaneous, and the polarisation angle can vary on the same timescale as the image relative delay (Biggs et al, 1999). However, the effect of differential rotation between the A and B image paths is apparent in the increase with wavelength of the difference between the core PAs of A and B. Indeed, the parallel PAs of the A and B cores at 43 GHz (where Faraday rotation is negligible) nicely demonstrates a basic property of gravitational lensing - that the PA of polarisation is unchanged by the action of the lens, even though source structural position angles may be changed in the images.

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References

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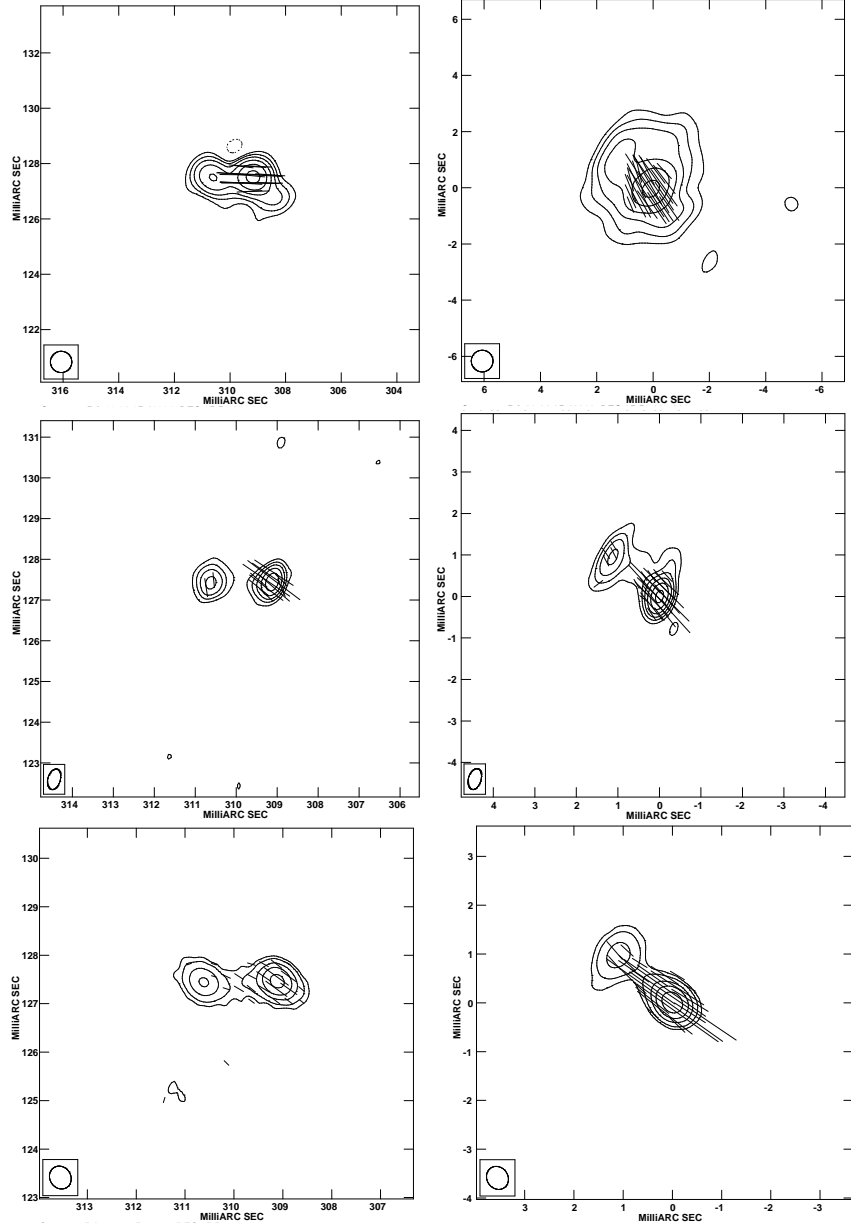


Figure 1. VLBI Polarisation maps of B0218+357. **Left:** Image B **Right:** Image A. Total intensity contours are at relative levels: -5, 2, 5, 10, 20, 40, 80, 160; within each map the length of vectors are proportional to linearly polarised intensity and their direction is that of the radiation E field. CLEAN restoring beams are plotted in the lower left of each map. **Top:** 8.4 GHz **Middle:** 22 GHz **Bottom:** 43 GHz